10. LILLIWAUP CONSERVATION UNIT

10.1. Introduction

The Lilliwaup Conservation Unit includes the Lilliwaup River and Skokomish River watersheds, as well as the estuaries and nearshore up to the Hama Hama watershed. The native summer chum salmon of Lilliwaup Creek are shown to be significantly different from other summer chum populations in Hood Canal based on analysis of genetic samples. This genetic data, and the geographic separation from the other populations, lead to Lilliwaup being categorized as a separate stock (WDFW and PNPTT 2000). The Lilliwaup stock is one of the six core stocks that comprise the Hood Canal summer chum salmon population as identified by the PSTRT (Currens 2004 Draft in progress). A hatchery operated by Long Live the Kings (LLTK) is located on lower Lilliwaup Creek. It rears summer chum for release into the creek (summer chum salmon are the only species released into the stream). This program is part of the summer chum salmon supplementation program (WDFW and PNPTT 2000). This supplementation program began on Lilliwaup Creek in 1992 as a cooperative project between the Hood Canal Salmon Enhancement Group (HCSEG) and WDFW. In 1994, LLTK assumed the role of the primary project operator.

Current habitat conditions and situations were assessed using a variety of sources. Several sources were used to assess the summer chum salmon stocks in the Eastern Strait of Juan de Fuca conservation unit. This Salmon Recovery Plan (SRP) will not repeat the details of these assessments, but instead refers the reader to the cited documents. All material and documents referenced in this SRP should be considered part of, and integral to, the recovery of summer chum salmon. These sources provided the primary reference and knowledge base for development of these aspects of the SRP. Details of the EDT assessments for the Eastern Strait of Juan de Fuca stocks, including a summary of the baseline performance measures, and a summary of strategic priorities, are provided in Lestelle et al, (2005a) (see Appendix A). The EDT Method is a widely used tool to help prioritize habitat restoration and protection measures for salmon populations. It provides a systematic way of diagnosing habitat conditions that have contributed to the current state of populations, and it enables an assessment of priorities for developing restoration and protection plans. It also provides an analytical procedure for assessing the potential benefits to salmon populations of actions that might be taken to address habitat related issues impeding recovery. Other detailed assessments of habitat and environmental conditions are provided in the SCSCI (WDFW and PNPTT 2000), Correa (2002), and May and Peterson (2003).

Lestelle, et. al. (2005a) surmise that the Lilliwaup summer chum salmon population is one of five extant Hood Canal summer chum salmon populations (Quilcene, Lilliwaup, Hama Hama, Duckabush, Dosewallips) that had relatively large escapements prior to about 1980. That was followed by severe drops in

abundance until the mid to late 1990s. Then, escapement began to increase. The consistent pattern amongst these five stocks is attributed to (from Lestelle, et. al. 2005a):

- Favorable ocean conditions for marine survival until the mid 1970s, followed by a regime shift in the ocean that was unfavorable for survival until near the turn of the century when conditions switched again to favor marine survival;
- Low harvest rates prior to the mid 1970s, followed by steadily increasing rates on Hood Canal populations, sometimes exceeding 80% and averaging close to 60% in the 1980s; harvest rates fell sharply in the mid 1990s and were at very low levels again when ocean survival conditions turned favorable;
- Hatchery supplementation fish beginning to return to the Quilcene system in 1995 and several years later to the Hama Hama and Lilliwaup systems, roughly near or corresponding to the period of improving ocean conditions and low harvest rates; although no directed supplementation has occurred in the Dosewallips or Duckabush systems, some stray hatchery fish are suspected to have entered those streams in the late 1990s.

Managed public forestland accounts for 89% of the watershed area. Riparian degradation, estuarine habitat loss, and low channel complexity appear to be the principal habitat factors associated with the decline of summer chum in the Lilliwaup Creek watershed (WDFW and PNPTT 2000). WDFW and PNPTT (2000) further surmise that limited spawning habitat likely restricted the summer chum population in Lilliwaup Creek under natural conditions. And, human occupation and use of the Lilliwaup Creek floodplain and estuary has probably further diminished summer chum production potential.

The Skokomish River estuary and delta area provide for important rearing and migration habitats for summer chum juveniles in lower Hood Canal.

10.2. Geographic Description & Human Population Distribution

The Lilliwaup Conservation Unit includes the Lilliwaup River and Skokomish River watersheds. Also included within this unit are the marine nearshore waters starting at the mouth and estuary of the Skokomish River delta and moving north coursing the west side of Hood Canal through to the southern extent of the Hama Hama River estuary. The marine off shore areas of south Hood Canal are included in this conservation unit. This conservation unit lies almost entirely within Mason County and includes the Lilliwaup River watershed. The Lilliwaup watershed covers an area of almost 18 square miles with 6.9 miles of mainstem length. Lilliwaup Falls, at river mile (RM) 0.7, blocks anadromous passage upstream on Lilliwaup Creek. Spawning surveys indicate summer chum use the full extent of this anadromous zone in Lilliwaup Creek.

Figure 10.1 provides a map of the Lilliwaup Conservation Unit.

Figure 10.1. Lilliwaup Conservation Unit (map produced by Gretchen Peterson, Peterson GIS).

The Skokomish Indian Reservation is located at the mouth of the Skokomish River. Other human developments of significance continue north from the Skokomish Tribal Reservation through Potlatch and up into Hoodsport, along the western shore of southern Hood Canal. Another small settlement is located at Lilliwaup. Detailed descriptions of each of these watersheds can be found in SCSCI Appendix 3.6 (WDFW and PNPTT 2000) and the WRIA 16 habitat limiting factors report (Correa 2003).

10.3. Summer Chum Salmon Stocks' Description & Distribution

Several sources were used to assess the summer chum salmon stocks in the Lilliwaup conservation unit. This Salmon Recovery Plan (SRP) refers the reader to the appropriate documents that are cited in this section. All material and documents referenced in this SRP should be considered part of, and integral to, the recovery of summer chum salmon. The reader is urged to review the Summer Chum Salmon Conservation Initiative (SCSCI) (WDFW and PNPTT 2000) and subsequent supplemental reports. Summer chum salmon in Hood Canal and the Eastern Strait of Juan de Fuca were also assessed based on application of the Ecosystem Diagnostic and Treatment (EDT) Method. The complete detailed EDT for summer chum salmon can be found at http://www.wa.gov/hccc/ and click on the Salmon Recovery Planning Activities link. On that page can be found links to various documents and the EDT web

site for summer chum salmon. The web address for the EDT site: www.mobrand.com/edt/sponsors/show_sponsor.jsp?sponsor_id=11

Naturally produced summer chum salmon originating from the Lilliwaup Conservation Unit are likely from the Lilliwaup watershed (WDFW and PNPTT 2000). Summer chum spawn in the mainstem of Lilliwaup Creek up to RM 0.7 where a falls blocks any further passage.

10.3.1. Stocks' Status & Trends

Current, historic and presumed summer chum salmon distribution in the Lilliwaup Conservation Unit is shown in Figure 10.2.

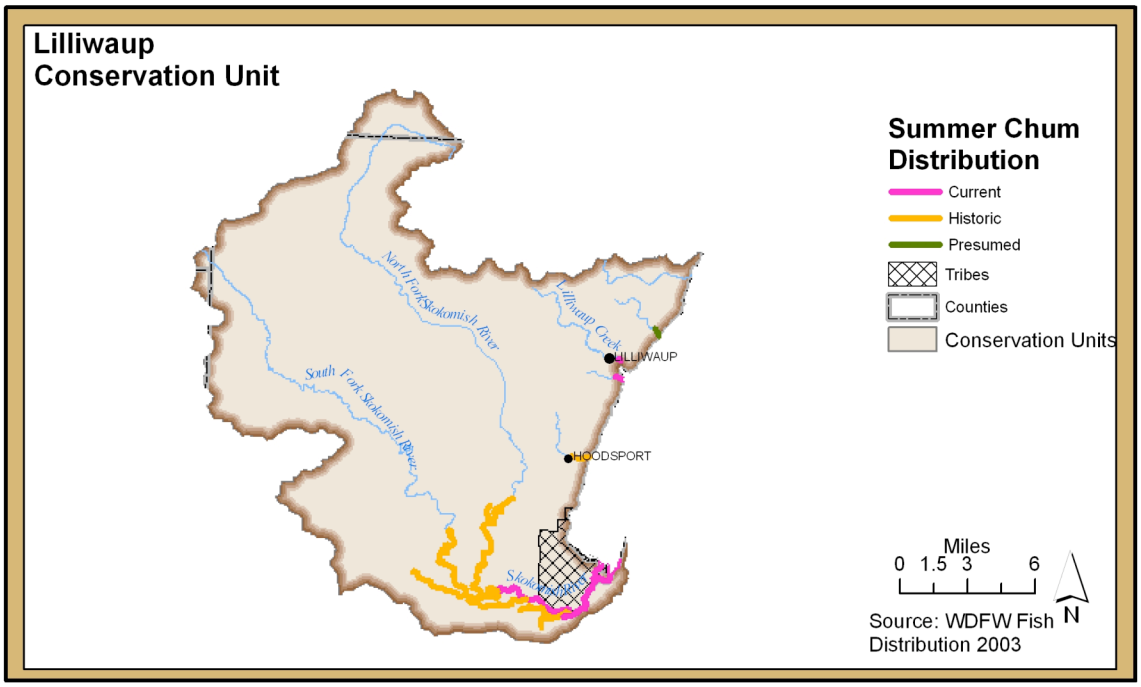

Figure 10.2. Map of the Lilliwaup Conservation Unit showing current, historic and presumed summer chum salmon distribution.

Summer chum salmon produced from Lilliwaup Creek are part of the Hood Canal population targeted for recovery by the PSTRT. The Hood Canal population is one of two independent summer chum populations tentatively identified by the PSTRT (Currens 2004 Draft in progress). Currens (2004 Draft in progress) provides a detailed analysis of these conclusions. He speculates on the importance of the historical geographic distribution of summer chum salmon habitat and the overall "isolation-by-distance relationship." That relationship seems to be observed in the summer chum salmon aggregations. More analyses of population identification and viability are expected from the PSTRT. At this time it is not expected that this further analyses will affect the basic approach taken for recovery in this SRP.

PNPTT and WDFW (2003) have identified the stock that is naturally produced in Lilliwaup Creek to target for recovery in the Conservation Unit. The Lilliwaup Creek stock is one of the six stocks that comprise the PSTRT designated Hood Canal aggregation. The co-manager interim recovery goals for these stocks are presented in Table 10.1.

Table 10.1. Hood Canal aggregation: co-manager interim abundance and escapement recovery goals for the Lilliwaup spawning aggregation.

Stocks	Abundance	Escapement
Lilliwaup	3,130	1,960

PNPTT and WDFW (2003) also developed abundance and spawning escapement threshold criteria. One of the criterion for recovery is that a summer chum stock (Lilliwaup) must, over a minimum of the recent twelve year period, have both a mean abundance and mean escapement of natural-origin recruits that meets or exceeds the defined thresholds. Table 10.2 provides a summary of escapement for the recent twelve year period, 1993-2004, for the Lilliwaup spawning aggregation.

Table 10.2. Escapement threshold for the Lilliwaup spawning aggregation based on PNPTT and WDFW (2003).

	ESCAPEMENT				
Population aggregation	**93-04 Average**	**target**	**% of target**	**# times below target 2001-2004 (≤1)**	**# times below target 1997-2004 (≤2)**
Lilliwaup	229	3130	12	4	8

The Lilliwaup aggregation currently falls well below the escapement threshold as established by the co-managers. This population is likely a combination of both hatchery and natural-origin recruits. A cooperative supplementation project between the HCSEG and WDFW was initiated in 1992. Starting in 1994 Long Live the Kings assumed primary project operator responsibilities. Broodstock, from naturally produced Lilliwaup stock, was used to supplement the summer chum salmon of Lilliwaup Creek.

Additional co-manager criteria require that the stocks do not fall below the target more than once in the recent four-year period and no more than twice in the recent eight-year period. Again, the Lilliwaup aggregation fails to meet the threshold for the recent four-year period and for the recent eight-year period. It should also be noted that criteria for productivity (for example, eight year average equal to or greater than 1.6 recruits per spawner) must be met for recovery. Data currently are insufficient to assess the productivity criteria but are being collected (PNPTT and WDFW 2003).

Summer chum salmon escapement (number of adults returning to spawn) for Lilliwaup Creek from the years 1974-2004 is presented in Figure 10.4.

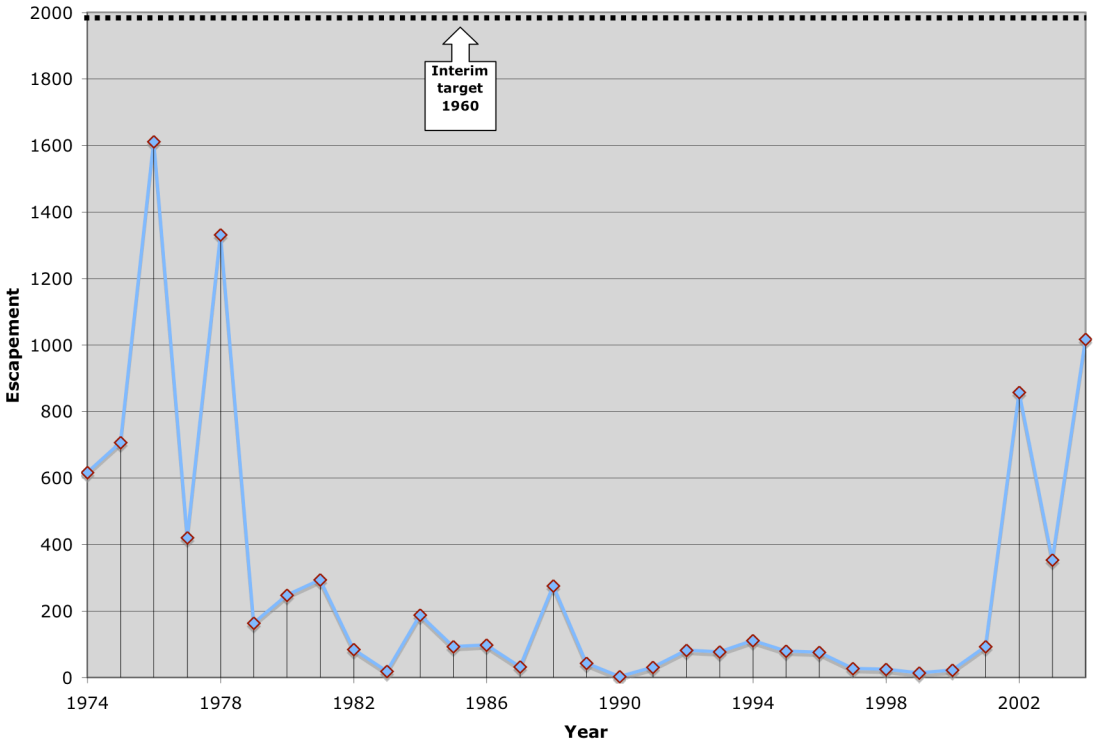

Figure 10.4. 1974-2004 summer chum salmon escapement for Lilliwaup Creek (data source: WDFW and PNPTT 2003, 2004, and 2005).

The co-managers have assessed the extinction risk faced by individual summer chum salmon stocks based on the methodology offered by Allendorf, et. al. (1997). This is also discussed in detail in section 1.7.4 of the SCSCI (WDFW and PNPTT 2000). The extinction risk was assessed again in 2003 based on data available through 2002 (WDFW and PNPTT 2003). This assessment by the co-managers for the Lilliwaup stock states, "Estimated escapements to Lilliwaup Creek range from 13 to 858 over the last four years, averaging 246 spawners. The effective population size (N_e) equals 77 fish for the 1999-02 return years, and total population size (N) is 887 for the same years. Because the population meets two high risk criteria (low population size, $N_e < 500$ or $N < 2,500$) and is in a chronic depression situation, the risk of extinction is judged to be high."[47]

[47] It should be noted that the co-managers' extinction rate assessment for Lilliwaup has changed in a more recently updated assessment that includes the years 2003 and 2004. The update indicates the risk of extinction to now be moderate rather than high, owing primarily to the high escapements in 2003 and 2004 (WDFW and PNPTT In preparation).

10.4. Habitat overview & environmental conditions

Details of the EDT assessments for the Lilliwaup stock, including a summary of the baseline performance measures and a summary of strategic priorities, are provided in Lestelle, et. al. 2005a (see Appendix A). The EDT Method is a widely used tool to help prioritize habitat restoration and protection measures for salmon populations. It provides a systematic way of diagnosing habitat conditions that have contributed to the current state of populations, and it enables an assessment of priorities for developing restoration and protection plans. It also provides an analytical procedure for assessing the potential benefits to salmon populations of actions that might be taken to address habitat related issues impeding recovery. Other detailed assessments of habitat and environmental conditions are provided in the SCSCI (WDFW and PNPTT 2000), and Correa (2003).

10.4.1. Factors contributing to the decline of summer chum salmon

According to WDFW and PNPTT (2000), recovery of summer chum in the Lilliwaup Creek watershed requires:

- Restriction of human activity in the lower floodplain to allow for the reestablishment of riparian forests and natural recruitment of LWD to the main channel.
- Restoration of a natural tidal distributary channel system across the waist of the estuarine delta through reduction of the impact from the Highway 101 road causeway.
- Protection of the Washington DNR-owned wetlands in upper Lilliwaup valley, which sustain summer flows in Lilliwaup Creek.

The Lilliwaup population shows a severe loss in performance, particularly in productivity. Under sustained, unfavorable ocean conditions, the population would be at a high risk of extinction (Lestelle, et. al. 2005a).

In summary, the EDT Conclusions for Lilliwaup (Lestelle, et. al. 2005a) suggest, that:

- The Lilliwaup population shows a high loss in performance compared to historic levels both in abundance and productivity, particularly under unfavorable ocean survival conditions.
- The amount of potential increase in population abundance is greatest through restoration of freshwater reaches; full restoration of estuarine-marine waters beyond the natal subestuary offers the next highest level of benefit, though much less than would be provided in freshwater.
- Protection of freshwater reaches shows the highest priority.

- Potential benefits of restoring estuarine-marine areas are diffused over many segments.
- Within freshwater, habitat diversity and sediment load are seen as the most important factors to restore.
- Within the natal subestuary, several factors appear to be equally important for restoration, along with the amount of area available to be used for rearing.
- Within the estuarine-marine environment, the most important factor for restoration is food, associated with loss of eelgrass, revetments, and loss of riparian corridors.

The Skokomish River delta and associated estuarine areas provide vital rearing habitats for juvenile summer chum salmon. Probably the largest long-term impact to this delta for juvenile salmon rearing, in addition to many other ecological functions, has been the steepening of the delta and the loss of approximately 17% of the delta's eelgrass habitat along the face of the delta. These impacts are primarily attributed to the loss of sediment transport through the delta due to water withdrawals out of the North Fork Skokomish by the Cushman hydroelectric project. Diversion of the North Fork has severely degraded estuarine habitat conditions for summer chum by disrupting sediment transport and natural salinity and nutrient regimes in the subestuary and intertidal delta, and by reducing the extent of tidal influence in the Skokomish River (WDFW and PNPTT 2000).

The SCSCI (WDFW and PNPTT 2000), and the "Limiting Factors Report for WRIA 16" prepared by the Washington Conservation Commission (Correa 2003), provide details of the various habitat factors and environmental conditions affecting summer chum salmon in this conservation unit. In general, the findings from these reports are corroborated by the EDT assessment (Appendix A). These factors and conditions are summarized in the Table 10.3 for Lilliwaup Creek and the Skokomish River estuary.

Table 10.3. Lilliwaup Creek and Skokomish River estuary

Factors for decline	Life stage most affected	Remarks
Loss of channel complexity (LWD, channel condition, loss of side channel, channel instability)	Spawning and incubation	Based on aerial photo interpretation and communication with local residents, approximately 600 feet of Lilliwaup Creek at RM 0.2 was straightened and dredged. The lack of LWD in both the creek and estuary also contributes to reduced channel complexity, and raises the potential for channel instability and redd scour during peak flow events.

Riparian degradation	Spawning and incubation	Agricultural and residential development along the lower reaches of Lilliwaup Creek has reduced the extent and altered the age and species composition of the riparian forest. Elimination of riparian forests has decreased LWD recruitment sources for both the creek and estuary. Seventy-nine percent of the forested buffer below RM 0.7 is dominated by medium-sized (12-20 in dbh) trees of mixed conifer and deciduous composition, and 21% lacks a buffer altogether. Fifty-two percent of the buffer is >132 ft in width, while 48% is <66 ft wide and/or sparse.
Lilliwaup estuarine habitat loss and degradation (diking, filling, log storage, road causeways)	Juvenile rearing and migration	Of the estimated 48.2 acres of historic delta, one diked area associated with a fish hatchery accounts for a loss of 1.5 acres (3.1% of historic delta area). Fill for residential development on the south side of Lilliwaup estuary accounts for a loss of 1.2 acres (2.6%), and a human-excavated pond at a fish hatchery represents a loss of 0.5 acres (1%). In addition, the 0.12 mi long Highway 101 causeway that bisects the delta has constrained the estuarine distributary channels of Lilliwaup Creek, eliminated habitat area, and likely altered overall estuarine function by altering tidal circulation. Although a relatively small percentage of the historic delta area has been impacted, the location of these habitat alterations has likely contributed to their disproportionately large effect on the overall functional value of Lilliwaup estuary as juvenile rearing and transition habitat for summer chum.

Skokomish Delta: Estuarine habitat loss and degradation (diking, filling, log storage, road causeways)		Probably the largest long-term impact to the Skokomish River delta for juvenile salmon rearing, in addition to many other ecological functions, has been the steepening of the delta and loss of approximately 17% of the delta's eelgrass habitat along the face of the delta (Jay and Simenstad, 1996). This dramatic change is primarily attributed to the loss of sediment transport through the delta due to water withdrawals by the Cushman project. Diversion of the North Fork has severely degraded estuarine habitat conditions for summer chum by disrupting sediment transport abilities and natural salinity and nutrient regimes in the subestuary and intertidal delta, and by reducing extent of tidal influence in the Skokomish River. Of the original 2,175 acre delta (11.2 miles perimeter), 14.4% (313 acres) was diked for agriculture. A recent dike breach in the largest contiguous diked farm area in the delta (Nalley Farm, ~215 acres), has allowed tidal inundation of this area. Nine diked areas persist, totaling 99 acres (4.6% of original delta). Restoration of the Nalley Farm will contribute to increased juvenile summer chum rearing habitat although access is limited with the only dike breach located on the northern perimeter of the dike. Chum fry will have to migrate along existing dikes to the central portion of the delta before accessing the restoring wetland, and then predominantly at high tide. Dikes and several tidegates continue to keep wetlands isolated from the subestuary thereby cutting off the primary production in these once saltwater marshes. Two identifiable fill areas occupy approximately 5 acres (0.2% of historical delta area) of the delta and are thought to have a low impact. Thirteen roads or causeways cross or encompass the delta, the total length of which is 4.7 miles. Almost all of these roads are associated with dikes surrounding the original agricultural lands or service roads to electric line transmission towers. Even in the restoring Nalley Farm site, the dike

		roadways inhibit cross-delta movement of juvenile summer chum. Transmission tower service roads impact a long segment of the upper intertidal habitat, affecting tidal movement and fish foraging activity in the western portion of the delta. A debris dam and dilapidated concrete abutments are located at the junction of a major distributary channel in the delta that divides the Nalley Farm properties. The distributary once was a more prominent channel that provided access of migrating juvenile salmon to the central delta. Flow was intentionally reduced to this channel to reduce flooding potential, although some tidal flow persists.

10.4.2. Human development and land use

Population density throughout the conservation unit is relatively low. Figure 10.5 shows population density within the Lilliwaup conservation unit.

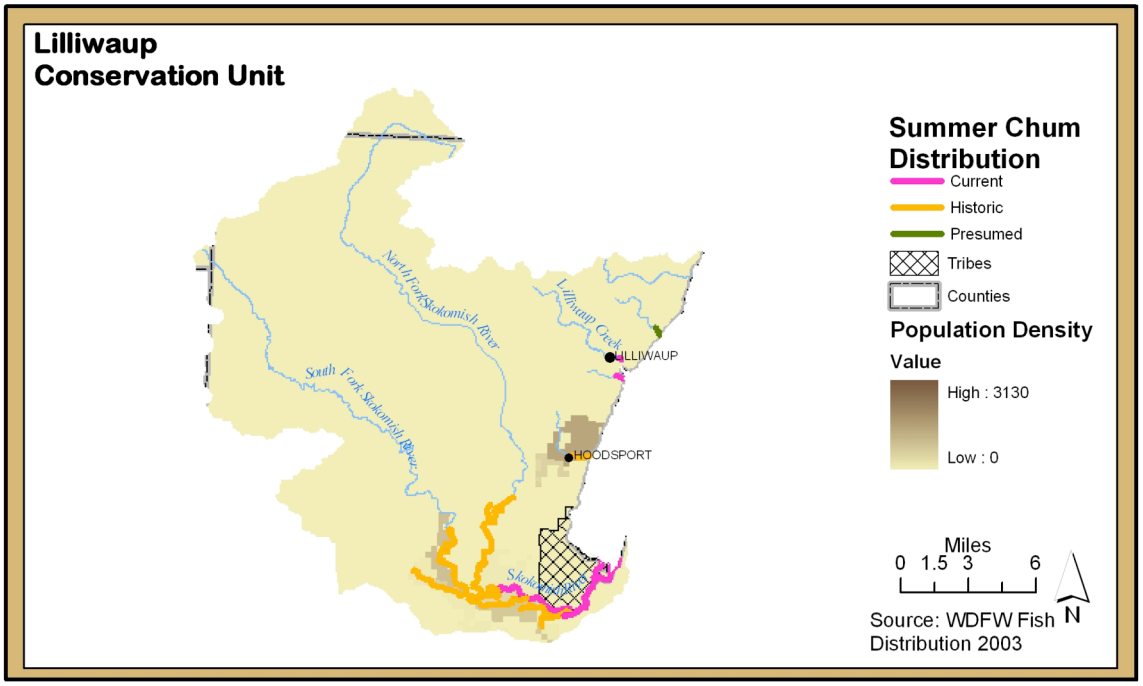

Figure 10.5. Human population density (people per square mile) for the Lilliwaup Conservation Unit (map produced by Gretchen Peterson, Peterson GIS).

The highest concentrations of human population are in the Hoodsport area and along the marine shoreline from Lilliwaup to Potlatch. WDFW and PNPTT (2000)

reports that the upper watershed is primarily forest lands with 89% in public ownership (2,189 acres or 19% of the total watershed acreage within Olympic National Forest and approximately 47% within WDNR ownership) and 7% in private ownership. By the early 1930s, the entire watershed was logged (WDFW and PNPTT 2000). Much of the lower floodplain has been converted to transportation and residential use.

Mason County has designated most of the lands in the lower Lilliwaup Creek watershed as conservancy. From the Mason County Code Title 7, "'Conservancy environment' means that environment in which the objective is to protect, conserve and manage existing natural resources and valuable historic and cultural areas in order to ensure a continuous flow of recreational benefits to the public and to achieve sustained resource utilization. The conservancy environment is for those areas that are intended to maintain their existing character. The preferred uses are those that are by nature non-consumptive of the physical and biological resources of the area. Non-consumptive uses are those uses that can utilize resources on a sustained yield basis while minimally reducing opportunities for other future uses of the resources in the area. Activities and uses of a nonpermanent nature, which do not substantially degrade the existing character of an area, are appropriate uses for a conservancy environment. Examples of uses that might be predominant in a conservancy environment include diffuse outdoor recreation activities, timber harvesting on a sustained yield basis, passive agricultural uses such as pasture and range lands and other related uses and activities. Compatible commercial uses are low intensity and low impact activities such as small camping or picnic facilities (less than ten spaces), aquacultural retail booths (less than six hundred square feet) and cottage industries when the operation is entirely contained within the primary residence excluding outbuildings, provided, such commercial activities must not alter the character of the conservancy environment. The designation of conservancy environments should seek to satisfy the needs of the community as to the present and future location of recreational areas proximate to concentrations of population, either existing or projected. The conservancy environment would also be the most suitable designation for those areas that present too severe biophysical limitations to be designated as rural or urban environments. Such limitations would include areas of steep slopes presenting erosion and slide hazards, areas prone to flooding, and areas which cannot provide adequate water supply or sewage disposal."

Mason County's Development Regulations, dated January 18, 2005, also designate the lands in the lower Lilliwaup watershed as Rural Residential. There are five types of Rural Residential districts. These districts primarily provide for low-density residential use, but also provide for some rural uses such as hobby farms. The hamlet of Lilliwaup is located in the lower sections at the mouth of Lilliwaup Creek. Hamlets are intended to provide a focal point and community identity for surrounding rural area, while they meet some of the immediate needs of rural residents, resource dependent industry, and visitors. Hoodsport is a

Rural Activity Center. Rural Activity Centers are concentrated settlements within Rural Lands that may include a variety of residential, small-scale commercial, resource-based and rural light industrial, recreation, and public uses. The majority of the marine shoreline in the Lilliwaup conservation unit is designated as Rural Residential (RR5).

The Skokomish Watershed is located in the northwest corner of the County and is largely occupied by Olympic National Park and Olympic National Forest. Although it is the largest watershed in the County, only 61,468 acres lie outside the National Park and National Forest boundaries. This watershed also includes Lake Cushman. The Skokomish Indian Tribe Reservation is located at the mouth of the Skokomish River. The Reservation area is approximately 5,000 acres. As of 1992, 525 enrolled tribal members lived on-reservation and 570 members lived off-reservation. Lands adjacent to the Skokomish Reservation in the lower Skokomish watershed are designated as Rural Residential. Long Term Commercial Forests represent the primary land use within the Skokomish watershed. This classification covers 28,704 acres and accounts for 46.7 percent of the watershed's land that lies outside of the National Park and National Forest lands.

Figure 10.6 shows the public ownership and distribution of summer chum salmon within the Lilliwaup conservation unit.

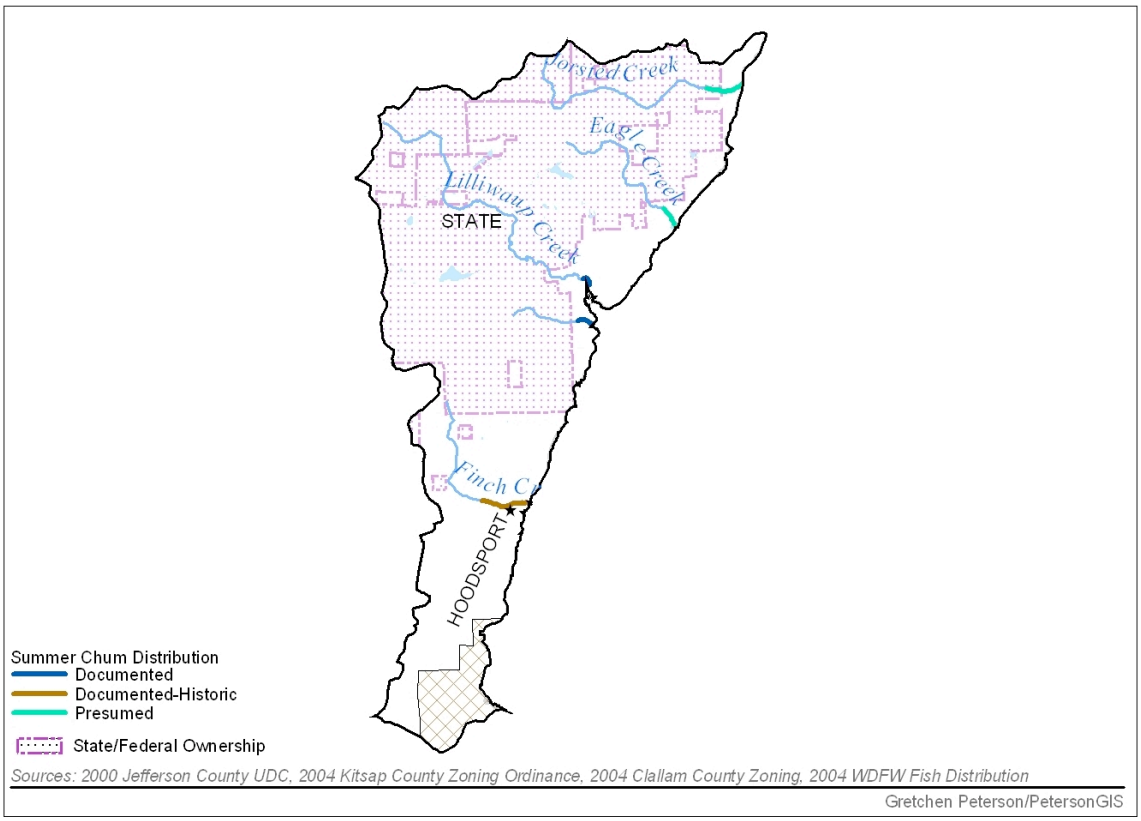

Figure 10.6. Land ownership and summer chum salmon distribution throughout the Lilliwaup conservation unit.

10.5. Specific action recommendations

Below are presented specific recovery action recommendations for the Lilliwaup conservation unit. Recommended actions are categorized as either Programmatic (section 10.5.1) or Project (section 10.5.2). Actions identified will be further delineated as actions to benefit the targeted Lilliwaup spawning aggregation. Specific action recommendations are summarized and analyzed in the context of overall ESU-wide recovery (see section 13). All actions (previously implemented, on-going, and proposed) would become part of the Monitoring and Adaptive Management Program for the SRP as described in section 14.

10.5.1. Programmatic recommendations

Programmatic recovery actions are those that are part of a policy, program, or process. They are generally of a regulatory or planning process nature. Programmatic actions could be part of a County's land use and regulatory program and structures or watershed planning processes. Comprehensive plans, critical areas ordinances, shoreline management master programs, and zoning could all be considered programmatic actions in this context.

Programmatic actions are non-project (i.e., habitat restoration projects--LWD placement, culvert repairs, etc.) in nature. Programmatic actions, however, can include projects when such projects are descriptive of a comprehensive or encompassing process (i.e., levee removal or set back as part of an estuary restoration plan). Watershed management plans often include projects to address identified factors of decline or specific habitat conditions. For the purposes of this SRP, the management plans or planning processes will be considered programmatic actions whereas the projects identified within the management plans will be categorized as projects.

To most effectively address those factors that are likely affecting the performance of the spawning aggregations in this conservation unit, the SRP recommends the following programmatic actions summarized in Table 10.4.

Table 10.4. SRP recommended programmatic actions for the spawning aggregations in the Lilliwaup conservation unit.

Recommended Programmatic Actions	Actions involved	Limiting factors to address
Mason County zoning and comprehensive plan/CAO updates	-support the update of Mason County CAO as per GMA requirements and development of the comprehensive plan -monitor long-term effectiveness of the zoning code and enforcement	-poor riparian condition -loss of channel complexity (LWD, channel condition, loss of side channel, channel instability)
Stormwater management planning for Hoodsport and Skokomish areas	-support the efforts of Mason County and the Skokomish Indian Tribe to develop stormwater management practices and facilities.	-water quality and stream flow -see SRP section 13
Lilliwaup Creek Summer Chum Salmon Supplementation Project	-continue the supplementation project operated by LLTK to ensure appropriate and properly funding monitoring occurs. -see section 14 of this SRP	-see WDFW and PNPTT (2000) and (2003a) for complete details of this project, also section 5 of this SRP
Olympic National Forest and State lands	-continue to preserve these lands in current ownership -Forest Service road maintenance and road abandonment plans should be implemented including appropriate resources to effectively complete the projects	-sediment aggradation
Community Nearshore Restoration Program	-pursue application and implementation of a Community Nearshore Restoration program for mid to southern Hood Canal similar to that being conducted in south Hood Canal (see section 13)	-estuarine and nearshore habitat loss and degradation

10.5.2. Project recommendations

Project recovery actions are generally physical modifications to the landscape designed to address specific habitat situations in specific and limited geographic areas. Projects in the summer chum salmon ESU have been in process for many years by a variety of groups and entities. Section 10.5.2.1 provides an overview of existing projects relative to summer chum salmon recovery planning. Many of the project recommendations presented in this SRP are from the HCCC Lead Entity strategy (HCCC 2004). This SRP is designed to coordinate with and build on that strategy. Projects presented are categorized according to their benefit for the Lilliwaup spawning aggregation.

10.5.2.1. Existing Projects

Long Live the Kings operates a hatchery on Lilliwaup Creek a part of the co-managers summer chum salmon supplementation program (see section 5). Other existing projects have been implemented in the Skokomish System. Figure 10.7 shows the location of existing projects in the lower Skokomish watershed.

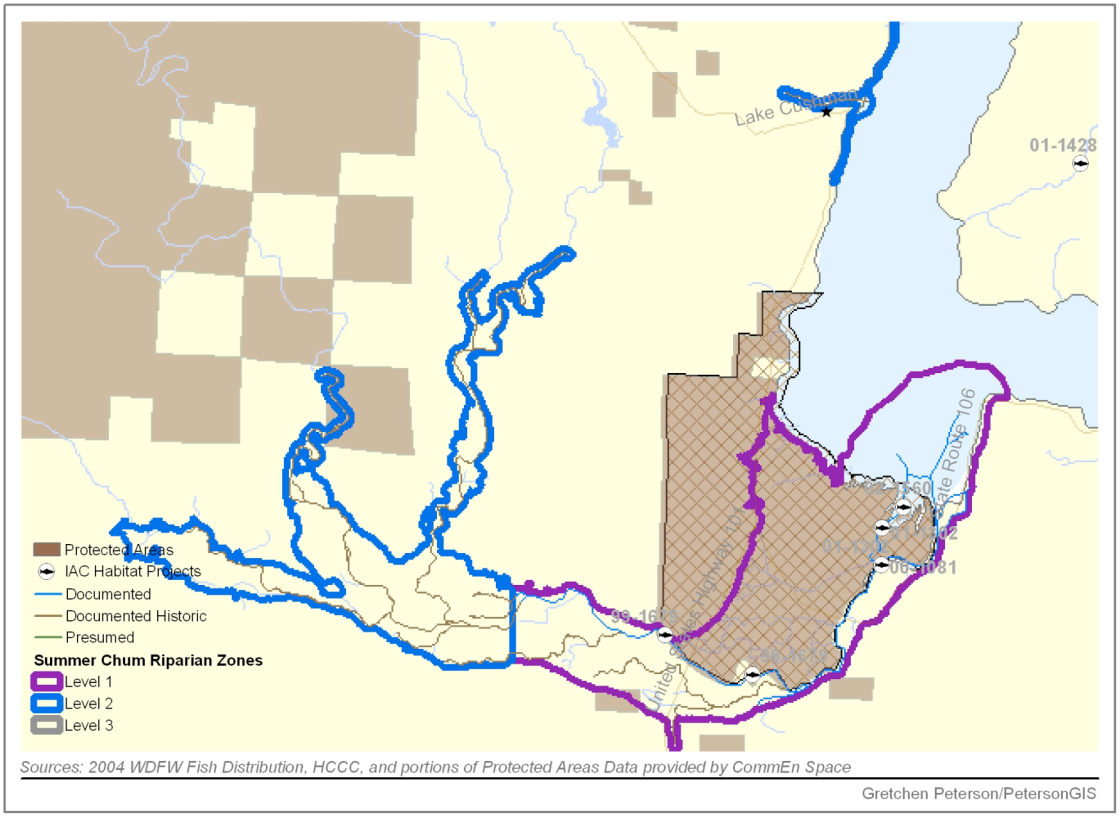

Figure 10.7 shows existing projects in the lower Skokomish watershed.

Projects located in the lower Skokomish River watershed that are likely to benefit summer chum salmon are described. The following existing project descriptions are derived from IAC Grant Projects at http://www.iac.wa.gov/maps/default.asp and click on the Grant Project Maps link, accessed on June 9, 2005:

Skokomish River, North Channel Oxbow, Project 99-1679 Description:
This project's objective was to increase and restore summer chum and Puget Sound Chinook habitat within the Skokomish Indian Reservation. Phase 1 removed impenetrable barriers to fish passage in a historic river meander bend, reconnected oxbow ponds to the Skokomish River, installed large organic debris, removed invasive plant species and revegetated with native plants. The expected result will be restoration of approximately 3/4 mile of spawning, overwintering, and summer rearing habitat for multiple salmon species. Phase 2 installed an engineered log jam at the head of the project.

Bourgault/North Channel Restoration phase 2, Project 00-1081 Description:
This project supports the restoration and maintenance of surface hydrologic connectivity between a historic river meander bend and the Skokomish River during all hydrologic flows throughout the system. The goals of the project are to increase salmon over-wintering and summer rearing habitats, as well as increase the available spawning area. The site is located within the Skokomish Indian Reservation boundaries. Project elements include bank stabilization, reconfiguring the channel, installing engineered log jams, removing exotic invasive vegetation, planting native species, installing sediment and livestock fencing, and salmon carcass placement. Displaced fishers and timber workers from economically distressed counties will work as Resource Technicians to provide labor for this project. Multiple salmon species and stocks are anticipated to make use of this restored area, including ESA listed threatened species Hood Canal summer chum and Puget Sound chinook salmon.

Skokomish River Tide Gate/Culvert, Project 01-1302 Description:
This project, sponsored by the Skokomish Indian Tribe, will remove tide gates, replace culverts, & breach dikes within a diked agricultural area that was formerly part of the estuary, near Skokomish River mouth, within the reservation. Other restoration will include removal of scotch broom, & planting sweetgrass. Tacoma Public Utilities owns other portions held in fee status. The project will implement recommendations of a 1995 Army Corps of Engineers study. This project will also initiate a long-term monitoring study that will provide information on estuary rehabilitation & adaptive management.

Skokomish River Nalley Island Levee Removal, Project 02-1560 Description:
This project, sponsored by the Skokomish Indian Tribe, represents Phase 2 of the SRFB funded Skokomish River Estuary restoration, removing agricultural dikes and a seawall on Nalley Island. The project will restore tidal influence to over 285 acres. ESA listed chinook, summer chum and bull trout are all found

within this area. Historic evidence suggests that ESA listed summer chum spawning may have extended into the floodplain from the river mouth upstream. This project will also benefit coho, winter steelhead, fall and winter chum, pinks, sea run cutthroat, and potentially sockeye.

10.5.2.2. Project Recommendations for the Lilliwaup Spawning Aggregation

To most effectively address those factors that are likely affecting the performance of the Lilliwaup spawning aggregation the SRP recommends the following projects:

Table 10.5. SRP recommended projects for the Lilliwaup spawning aggregation.

Lilliwaup Creek

Project/Action	Tasks involved, sub-actions, barriers to implementation	Limiting Factors to Address
Extend SR101 bridge span and remove shoulders/fill	-would need to involve WSDOT and Federal highway agencies	-Estuarine habitat loss and degradation (diking, filling, log storage, road causeways)
Restore sediment supply from feeder bluff	-would need to involve WSDOT and Federal highway agencies	-Estuarine habitat loss and degradation (diking, filling, log storage, road causeways)
Remove bulkhead, fill, structures and groins at Lilliwaup Point to restore nearshore processes and juvenile migration corridor	-work with private landowners to implement softshore protections	-Estuarine habitat loss and degradation (diking, filling, log storage, road causeways)
Remove fill and development seaward of southern bridge abutment of SR101 to reestablish salt marsh habitat	-would need to involve WSDOT and Federal highway agencies	-Estuarine habitat loss and degradation (diking, filling, log storage, road causeways)
Remove trout pond diking, set back structures and roads and expand access road bridge	Work with landowners for property purchase and permission	-Loss of channel complexity (LWD, channel condition, loss of side channel, channel instability)
Daylight creek to falls on right bank of Lilliwaup estuary west of SR101 bridge	Work with landowners for property purchase and permission	-Estuarine habitat loss and degradation (diking, filling, log storage, road causeways) -Channel complexity (LWD, channel condition, loss of side channel, channel instability)
Restore channel complexity with LWD projects	0.8 miles of anadromous	-Loss of channel complexity (LWD, channel condition, loss of side channel, channel instability)

Riparian restoration with plantings		-Riparian degradation

Skokomish River estuary

Project/Action	Tasks involved, sub-actions, barriers to implementation	Limiting Factors to Address
Remove left bank dikes/ levees, roads borrow ditches and tide gates. Install raised walkway to maintain access		-Estuarine habitat loss and degradation (diking, filling, log storage, road causeways)
Remove Nalley Island dikes/ levees, roads, borrow ditches and tide gates		-Estuarine habitat loss and degradation (diking, filling, log storage, road causeways)
Remove bulkheads and fill and restore 6 acres of salt marsh along the east side of the delta	Work with TPU and private landowner	-Estuarine habitat loss and degradation (diking, filling, log storage, road causeways)
Remove TPU maintenance/access roads with the delta		-Estuarine habitat loss and degradation (diking, filling, log storage, road causeways)
Relocate TPU transmission towers to follow SR 106, and abandon access roads within salt marsh		-Estuarine habitat loss and degradation (diking, filling, log storage, road causeways)
Relocate access road to shellfish beds that extends into intertidal zone at the Skokomish Delta	-Possibly implemented with #2 above	-Estuarine habitat loss and degradation (diking, filling, log storage, road causeways)
Remove fill to historic shoreline midway through parking lot at Cushman boat launch and revegetate with native species	-public outreach required for implementation	-Estuarine habitat loss and degradation (diking, filling, log storage, road causeways)
Daylight lower Minerva Creek and restore estuary function	Property purchase required, then fill removal	-Estuarine habitat loss and degradation (diking, filling, log storage, road causeways)
Remove fill and restore historic salt marsh and tidal channels at Potlatch State Park	Work with State Parks to remove fill, sediment source has been impacted, so restoring sediments will encourage salt marsh regeneration	-Estuarine habitat loss and degradation (diking, filling, log storage, road causeways)
Reconstruct Enetai Hatchery trapping facility to allow better estuary function and tidal channel connectivity at		-Estuarine habitat loss and degradation (diking, filling, log storage, road causeways)

Enetai Creek		
Pull pilings and fill from within the delta of old Potlatch Lagoon to restore intertidal wetland		-Estuarine habitat loss and degradation (diking, filling, log storage, road causeways)